

Finucane, John H.
Contributor No 131

PROPERTY OF
Bureau Commercial Fisheries
Biological Laboratory Library
GALVESTON, TEXAS

Made in United States of America
Reprinted from LIMNOLOGY AND OCEANOGRAPHY
Vol. 6, No. 1, January, 1961
pp. 85-87

MODIFIED VAN DORN WATER SAMPLER

Van Dorn (1957) described a plastic water sampler which is relatively inert chemically, free flushing, and can be messenger activated. He used rubber "force cups" for closures, commonly known as "plumber's friends." We have devised a sampler of similar design but with improved rubber ball closures that eliminate malfunctions due to improper seating of the force cup closures. This sampler consists of Plexiglas tubes, 20 in. long with an outside diameter of 4.5 in. and a capacity of approximately 4 L (Fig. 1).

For van Dorn's closures we substituted 4.5-in. rubber balls, molded from gum rubber with $\frac{1}{4}$ -in. holes through the center. Neoprene or other similar lighter weight derivatives would be preferable if available. The most desirable feature of these ball closures is that they remain completely spherical after repeated use and form a perfect seal with the rims of the plastic sampling container. For a better fit and less wear on the

surgical rubber tubing connecting them, the inside rim of this sampler was machined to a 30° bevel and the outer rim sanded. The balls were connected to the rubber tubing as follows: one end of each ball hole was countersunk for $\frac{1}{2}$ in. to a diameter of $\frac{9}{16}$ in. The head of a 5-in. $\frac{1}{4}$ -20 brass bolt was inserted $\frac{1}{2}$ in. into the end of a 10-in. piece of $\frac{5}{16} \times \frac{3}{32}$ -in. surgical rubber tubing and held by a ligature of nylon thread. The bolt was passed through the ball hole and secured by a nut after a 1-in. micarta washer was first placed over the threaded bolt. By tightening the nut, the end of the rubber tubing was forced back against the walls of the countersunk $\frac{9}{16}$ -in. hole to form a tight non-metallic seal. Loops of Steelon wire were fastened to the upper part of the closures and inserted in the "U" head of the tripping rod in the cocked (pretripped) position (Fig. 2). The ball closures were then outside the sampling container and permitted complete flushing. For more durability

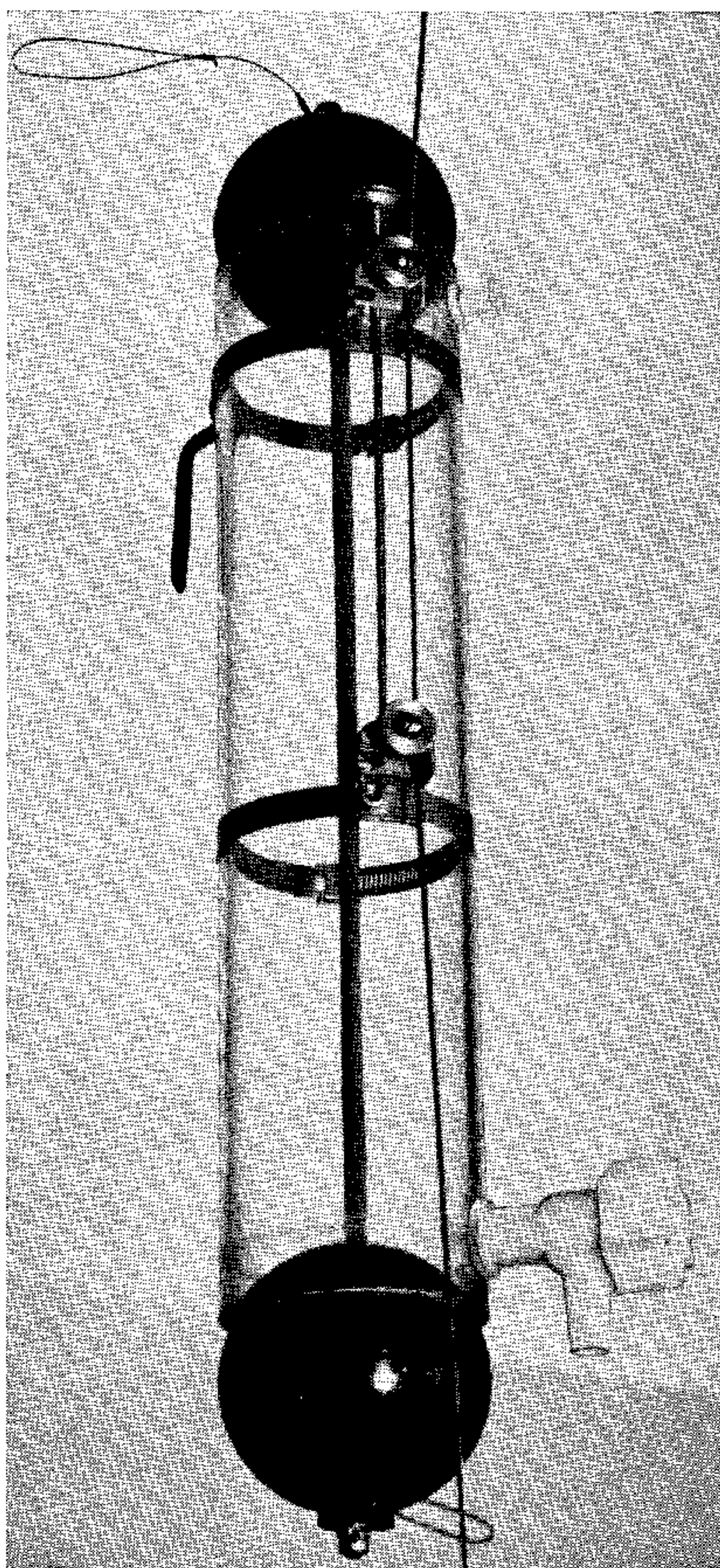


FIG. 1. Four-liter water sampler in closed position showing the attachment and tripping assemblies. Ball closures are held in place by tension of surgical rubber tubing.

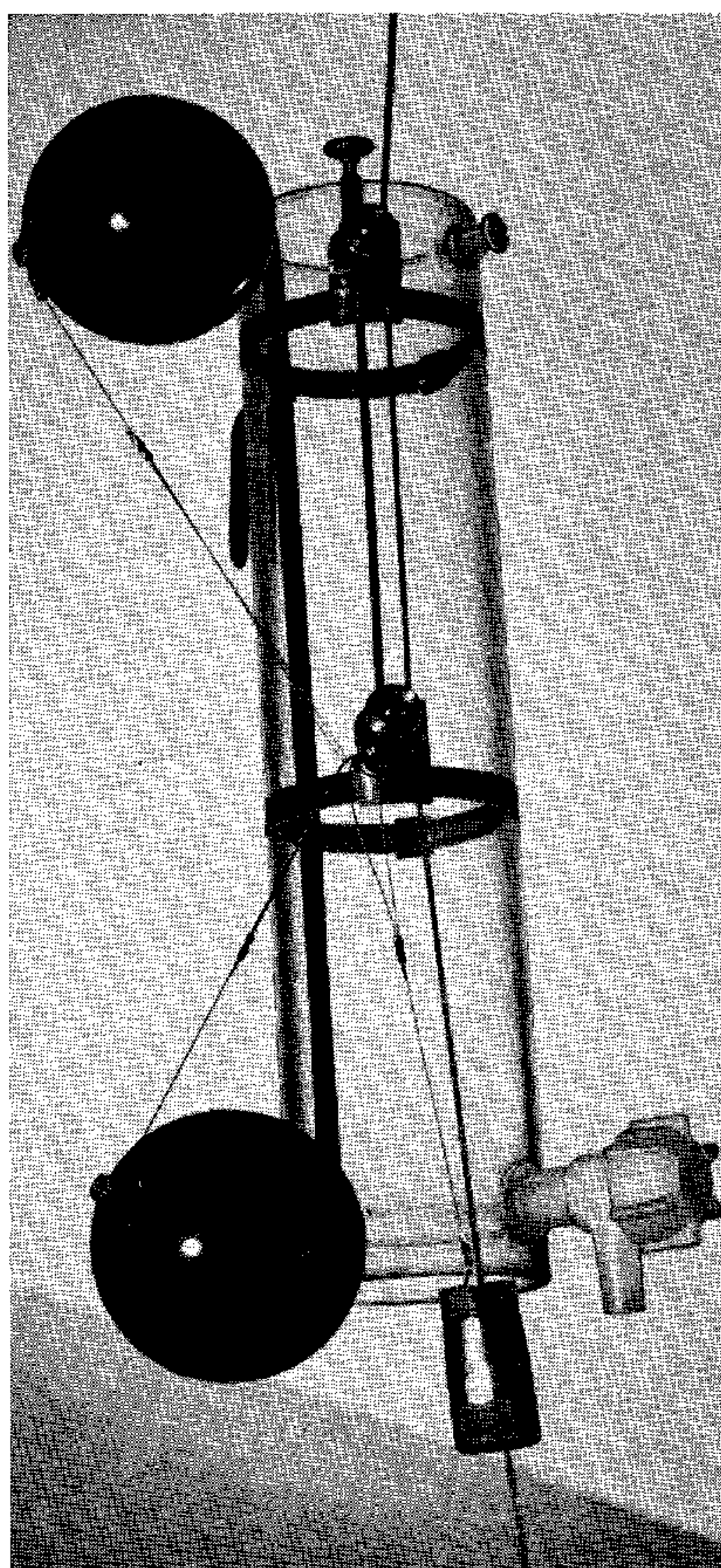


FIG. 2. Four-liter water sampler in a pretripped position showing wire loops from closures inserted in "U" bend of tripping rod and messenger attachment.

the sampling container can be made from polyvinyl chloride instead of the acrylic resin (Plexiglas) tubing used by van Dorn. Although polyvinyl chloride is extremely resistant to cracking and breakage, it is opaque, making it impossible to view the water level through the walls of the sampling container. Both plastics can be sawed

and machined easily. We used Nalgene¹ ½-in. threaded spigots with a Teflon "O" ring for draining and ¼-in. Nalgene plugs for venting our samplers. These proved more efficient in operation than latex hose equipped with pinchcocks. When available,

¹The Nalge Company Inc., Rochester 2, New York.

stainless steel bolts and nuts can be used instead of brass.

To attach these water samplers to the hydrographic wire, specially designed attachment and release assemblies were made for us by the Hytech Corporation.² These units consist of two cadmium plated irradiated brass castings provided with knurled stainless steel knobs, which tighten directly on the cable. This clamp can be used with any hydrographic cable between 3/32- and 7/32-in. diameter. A stainless steel 1/4-in. tripping rod with cadmium plated button and "U" head comprises the release assembly. This rod is 9 in. long from center to center of the clamp castings. The lower clamp assembly was used for both the release of the messenger as well as the wires for the closing valves. These attachment units provide stability on longer bottles and aid in supporting the weight of larger samplers. Two aereoseal

stainless steel hose clamps were used to fasten the attachment and release units to the samplers. For rack storage a handle was riveted to the upper aereoseal clamp.

These sample bottles are inexpensive to construct and permit multiple water samples to be made on one hydrographic cast. They are especially suitable for shallow water operation, where incomplete flushing of Nansen or similar water samplers may occur. Furthermore, the large capacity of the unit provides ample water for chemical and biological analysis.

JOHN H. FINUCANE AND
BILLIE Z. MAY

Galveston Biological Laboratory
U. S. Bureau of Commercial Fisheries
Galveston, Texas

REFERENCES

- VAN DORN, W. G. 1957. Large-volume water sampler. *Trans. Amer. Geophys. Union*, **37**: 682-684.

² Hytech Corporation, 6803 West Boulevard, Inglewood 3, California.